REMARKS

I.   Introduction

By the present Amendment, claims 1-7, 14, and 15 have been amended.
Claims 8-13 have been cancelled. Accordingly, claims 1-7, 14, and 15 remain
pending in the application. Claims 1 and 3 are independent.

II.   Office Action Summary

In the Office Action of March 30, 2007, the Drawings were objected to
because various figures lacked appropriate labels or legends. The Specification was
objected to because the Abstract was in improper format. Claims 1-13 were
objected to because of various informalities. Claim 3 was rejected under 35 USC
§112, first paragraph, as failing to comply with the enablement requirement.
Claims 1 and 3 were rejected under 35 USC §112, second paragraph, as being
indefinite for failing to particularly point out and distinctly claim the subject matter
regarded as the invention. Claims 1 and 2 were rejected under 35 USC §101 as
being directed to non-statutory subject matter. Claims 1 and 2 were rejected under
35 USC §102(e) as being anticipated by U.S. Patent No. 6,798,593 issued to Hattori
et al. ("Hattori"). Claims 3-15 were rejected under 35 USC §102(e) as being
anticipated by U.S. Patent Application Publication No. 2002/0051499 issued to
Cameron et al. ("Cameron"). These rejections are respectfully traversed.

III.   Objection to the Drawings

The Drawings were objected to because various figures contained boxes that
were not provided with appropriate labels or legends. The Office Action specifically

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identifies Figs. 1, 2, 4, and 8-13. Further, the Office Action required that Corrected Drawing Sheets be submitted to provide this information.

Concurrently submitted herewith, are Replacement Sheets containing drawing figures 1, 2, 4, and 8-13. The Corrected Drawings include appropriate labels as required in the Office Action.

Withdrawal of this objection is therefore respectfully requested.

IV.   Objection to the Specification

The Specification was objected to because the Abstract was in an improper format. The Office Action specifically indicated that the Abstract should be in narrative form and limited to a single paragraph ranging from 50-150 words.

Concurrently submitted herewith, is a new Abstract which has been prepared to better define the claimed invention and conform with the requirements of MPEP §608,01(b).

Withdrawal of this objection is respectfully requested.

V.   Objections to the Claims

Claims 1-13 were objected to because of various informalities. Regarding this objection, the Office Action cites various instances of language that was improper and required correction.

By the present Amendment, Applicants have amended various claims, in part, to address the informalities objected to in the Office Action. Applicants respectfully submitted that all of these objections have now been addressed and remedied. Withdrawal of the objection is therefore respectfully requested.

VI.   Rejections under 35 USC §112

Claim 3 was rejected under 35 USC §112, first paragraph, as failing to comply with the enablement requirement. Regarding this rejection, the Office Action indicates that claim 3 recites subject matter that was not described in the Specification in such a way to enable one skilled in the art to make and/or use the invention. Regarding this rejection, the Office Action indicates that claim 3 recites "a circuit that adds a redundant code sequence by the first error correction," as well as "an error-correction encoding circuit that outputs a series of code sequence block as a code sequence recorded." The Office Action indicates that these features are not disclosed in the Specification.

The Office Action indicates that the Specification discloses the recording information data sector being divided into plural code blocks and the second error-correction coding being performed in units of divided individual code blocks. The redundant codes are added to the information data sector and divided into continuous plural code sequence blocks each of which has a predetermined length of the code symbols. The Office Action also indicates that the second error-correction coding is applied to each of the code sequence blocks and that the redundant codes are acquired and inserted to the corresponding code sequence blocks.

By the present Amendment, Applicants have revised independent claim 3 to address these issues. Specifically, independent claim 3 now provides a concatenated encoder that divides the error-correction code sequence output from the first encoding circuit into continuous plural code sequence blocks having predetermined lengths. Additionally, a first encoding circuit is recited for applying

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first error-correction coding to the information code sequence by the predetermined

unit and adding a first redundant code sequence to the coded information code

sequence.

Applicants respectfully submit that, as amended, independent claim 3 recites

subject matter that is aptly described in the Specification. Withdrawal of this

rejection is therefore respectfully requested.

Claims 1 and 3 were rejected under 35 USC §112, second paragraph, as

being indefinite for failing to particularly point out and distinctly claim the subject

matter regarded as the invention. Regarding th s rejection, the Office Action

indicates that the term "equal to or shorter than' recited in claims 1 and 3 renders the

claim indefinite.

By the present Amendment, Applicants have revised the claims to recite the

more definite phrase --equal to or less than--. Withdrawal of this rejection is

therefore respectfully requested.

Claims 3 and 5-13 were rejected under 35 USC §112, second paragraph, as

being incomplete for omitting essential elements. The Office Action indicates that

such an omission amounts to a gap between elements recited in the claims. The

Office Action indicates that the claims recite a c'rcuit that adds redundant code, an

error-correction encoding circuit, and a soft-output decoder. The Office Action

indicates that it is not clear where these elements are located or how they are

interconnected.

By the present Amendment, Applicants have revised the claims, in part, to

address the issues of indefiniteness raised in the Office Action. For example, the

recording signal processing system now includes a first encoding circuit that applies

a first error-correction coding to the information code sequence and adds a first

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redundant code sequence to the coded information code sequence. Further, a concatenated encoder is provided to divide the error correction code sequence, as well as generate a second redundant code sequence.

It is therefore respectfully submitted that, as amended, the presently pending claims satisfy the requirements of 35 USC §112, second paragraph.

VII.   Rejections under 35 USC §101

Claims 1 and 2 were rejected under 35 USC §101 as being directed to non-statutory subject matter. Regarding this rejection, the Office Action indicates that claims 1 and 2 are directed to data structures. The Office Action indicates that such recitation is merely non-functional descriptive material to be recorded on some computer-readable medium, and that merely claiming non-functional descriptive material stored in a computer readable medium does not make the claim statutory.

By the present Amendment, Applicants have amended claims 1 and 2 to define a magnetic recording/reproducing apparatus that includes, in part, a recording medium, a recording/reproducing signal processing circuit, as well as various features of a format for recording data on the recording medium.

Applicants therefore respectfully submit that, as amended, claims 1 and 2 include structural limitations, and therefore, satisfy the requirements of 35 USC §101.

VIII.   Rejections under 35 USC §102

Claims 1 and 2 were rejected under 35 USC §102(e) as being anticipated by Hattori. Regarding this rejection, the Office Action indicates that Hattori teaches a method and apparatus for recording information on a recording medium of an optical recording system. The Office Action further states that the signal recording side

routinely uses a system of modulation and coding of the signal in a preset fashion to

record the resulting modulation-coded signal. The modulation coding can be

classified into a block coding system in which input bits are divided into plural blocks

of preset length and output bits generated or divided into plural blocks of preset

lengths corresponding to the blocks of the input bits, as well as a variable length

coding system in which encoding units of input bits and output bits associated with

the input bits are variable. Applicants respectfully disagree.

As amended, independent claim 1 defines a magnetic recording/reproduction

apparatus that includes a recording medium to which information is recorded to a

data sector by a predetermined format. The apparatus also includes a magnetic

head for recording/reproducing the information. The apparatus comprises:

> a recording/reproducing signal processing circuit for processing
> the information to be recorded or reproduced;
>   said format on the medium comprising:
> a preamble including additional information for the control of
> recorded position information, amplitude gain control and data timing
> recovery;
> an information code composed of plural code sequence blocks;
> a first redundant code composed of plural code sequence blocks
> used for hard-decision type data error correction;
> a second redundant code inserted in the code sequence block
> used for soft output type error correction;
> wherein the number of code symbols of the second redundant
> code is equal to or less than a number of code symbols of the first
> redundant code.

According to independent claim 1, the magnetic recording/reproducing

apparatus comprises a recording/reproducing signal processing circuit for processing

the information to be recorded or reproduced. Furthermore, the format for recording

data to the recording medium includes a preamble having additional information for

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the control of recorded position information, amplitude gain control, and data timing recovery. The format further includes an information code, a first redundant code, and a second redundant code. The information code is composed of plural number of code sequence blocks and the first redundant code is composed of plural code sequence blocks used for hard-decision type data error correction. The second redundant code is inserted in the code sequence block used for soft-output type error correction. According to the apparatus of independent claim 1, the number of code symbols of the second redundant code is equal to or less than a number of code symbols of the first redundant code.

The Office Action had alleged that Hattori discloses all the features recited in the instant claims. Applicants' review of Hattori, however, has not revealed any disclosure for the features now recited in independent claim 1. Hattori discloses a method and apparatus for recording and reproducing data which improves performance and efficiency. The apparatus includes an error correction encoder, as well as a modulation encoder. As illustrated in Figs. 4 and 7, however, the modulation encoder 202 is a simple encoder that only performs code modulation. Further, this encoder is not capable of adding error correction codes. Consequently, it is not possible for Hattori to disclose a first redundant code and a second redundant code. Hattori also does not appear to perform concatenation of hard-decision type data error codes. Hattori simply fails to provide any disclosure for features recited in independent claim 1 such as:

> an information code composed of plural code sequence blocks;
>
>   a first redundant code composed of plural code sequence blocks used for hard-decision type data error correction;
>
> a second redundant code inserted in the code sequence block used for soft output type error correction;

wherein the number of code symbols of the second redundant code is equal to or less than a number of code symbols of the first redundant code.

It is therefore respectfully submitted that independent claim 1 is allowable over the art of record.

Claim 2 depends from independent claim 1, and is therefore believed allowable for at least the reasons set forth above with respect to independent claim 1. In addition, this claim introduces novel elements that independently render it patentable over the art of record.

Claims 3-15 were rejected under 35 USC §102(e) as being anticipated by Cameron. In support of this rejection, the Office Action indicates that Cameron discloses an apparatus for use with a code having a turbo encoded inner code linked to an algebraic code via an interleaver. The output of the interleaver is provided to a turbo trellis-coded modulation (TTCM) encoder (208). The interleaved output is provided to a second turbo encoder (203) which applies a parallel concatenated encoding to the input received from the interleaved output. The Office Action further alleges that some of the bits of the interleaved data output from the Reed-Solomon unit may bypass the turbo encoder entirely and be coupled directly to the mapper (205). Applicants respectfully disagree.

As amended, independent claim 3 defines a recording/reproducing signal processing circuit that includes a recording signal processing system and a reproducing signal processing system. The signal processing circuit is utilized for a storage recording/reproducing information code sequence consisting a plurality of code bits recorded by a predetermined unit in a recording medium. The signal processing system comprises:

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a first encoding circuit that applies first error-correction coding to the information code sequence by the predetermined unit, and adds a first redundant code sequence to said coded information code sequence, thereby generates an error-correction code sequence;

a concatenated encoder that:

divides the error-correction code sequence output from the first encoding circuit into continuous plural code sequence blocks having predetermined length,

stores the plural code sequence blocks,

executes second error-correction coding for each code sequence block, and

generates a second redundant code sequence with referring to the contents of each code sequence block ; and

a code switch that outputs the plural code sequence blocks and the second redundant code sequence alternatively, thereby generating the information code sequence comprised of the plural code sequence blocks;

wherein said information code sequence includes the first redundant code having a length of the code sequence block, the second redundant code is inserted in the code sequence block.

According to independent claim 3, the signal processing circuit includes a first encoding circuit, a concatenated encoder, and a code switch. The first encoding circuit applies first error-correction coding to the information code sequenced by the predetermined unit, and adds a first redundant code sequence to the coded information code sequence. This generates an error-correction code sequence. The concatenated encoder divides the error-correction code sequence output from the first encoding circuit into continuous plural code sequence blocks having a predetermined length. The concatenated encoder also stores the plural code sequence blocks and executes a second error-correction coding for each code sequence block. The code switch outputs the plural code sequence blocks and the second redundant code sequence alternatively in order to generate the information code sequence comprised of the plural code sequence blocks. Further, according to

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independent claim 3, the information code sequence includes the first redundant code having a length of the code sequence block and the second redundant code is inserted in the code sequence block.

Contrary to the allegations made in the Office Action, Cameron does not disclose all the features recited in independent claim 3. Cameron discloses a method for encoding and decoding information using turbo codes. Cameron provides two error-correction method, namely a Reed-Solomon code and a turbo code. Cameron, however, fails to disclose that the first error-correction code and the second error-correction code are concatenated with different code lengths. For example, Cameron discloses both the Reed-Solomon unit (201) and the turbo encoder (203) process as including message tuples having the same size. Further, Cameron appears to be completely silent on providing a concatenated encoder that divides the error-correction code sequence from the first encoding circuit. The art of record simply fails to provide any disclosure, or suggestion for features recited in independent claim 3 such as:

> a concatenated encoder that:
>> divides the error-correction code sequence output from the first encoding circuit into continuous plural code sequence blocks having predetermined length,
>> stores the plural code sequence blocks,
>> executes second error-correction coding for each code sequence block, and
>> generates a second redundant code sequence with referring to the contents of each code sequence block ; and

It is therefore respectfully submitted that independent claim 3 is allowable over the art of record.

Claims 4-7, 14, and 15 depend from independent claim 3, and are therefore believed allowable for at least the reasons set forth above with respect to independent claim 3. In addition, these claims each introduce novel elements that independently render them patentable over the art of record.

IX. Conclusion

For the reasons stated above, it is respectfully submitted that all of the pending claims are now in condition for allowance. Therefore, the issuance of a Notice of Allowance is believed in order, and courteously solicited.

If the Examiner believes that there are any matters which can be resolved by way of either a personal or telephone interview, the Examiner is invited to contact Applicants' undersigned attorney at the number indicated below.

Docket No. 520.43090X00
Serial No.10/651,998
Office Action dated March 30, 2007

AUTHORIZATION

Applicants request any shortage or excess in fees in connection with the filing of this paper, including extension of time fees, and for which no other form of payment is offered, be charged or credited to Deposit Account No. 01-2135 (Case: 520.43090X00).

Respectfully submitted,

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Attachments:

New Abstract

Replacement Sheets

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